
Trends and Developments in Housing: The Case of the Republic of Kazakhstan

Z.Z. Kenzhegaliyeva¹, U.Zh. Shalbolova², D.N. Silka³

Abstract:

This paper considers the issues of assessment of the current state and development trends of housing and communal services in the Western region of the Republic of Kazakhstan.

The conducted studies justify the effectiveness of the reform and the need for an integrated system to assess the development of housing and communal services in accordance with industry government programs.

The research was carried out according to statistical data of 2011-2016, based on the materials of the Western region, represented by Aktobe, Atyrau, West Kazakhstan and Mangystau regions.

Keywords: *Housing and communal services, economic assessment, engineering infrastructure, urban economy.*

JEL Classification: *O18.*

¹L.N.Gumilyov Eurasian National University, E-mail: zita.kenzhegalieva@bk.ru

²L.N.Gumilyov Eurasian National University.

³National Research Moscow State University of Civil Engineering.

1. Introduction

Housing and communal services are an integral part of the modern city, acting as a key factor in ensuring essential household conditions for the population and the regularity of production processes in the industry of the national economy. The economic status and timeliness of functioning of the housing and communal infrastructure has a direct impact on the well-being of society, the production activity of economic entities, and the satisfaction of the population with the state policy.

In post-Soviet countries with an emerging market economy, the sphere of housing and communal services is still subsidized and operates through the implementation of State reforms in this area. During the years of independence, a number of reforms on the development of housing and communal services were implemented in the Republic of Kazakhstan: the State Housing Construction Program in the Republic of Kazakhstan for 2005-2007, the State Housing Construction Program in the Republic of Kazakhstan for 2008-2010, the State Program "Ak Bulak" for 2011-2020, the Program "Affordable Housing 2020", the Program for the Modernization and Development of Housing and Communal Services to 2020, the Program for Regional Development to 2020, etc.

Today, the industry under investigation regulates its activities in accordance with a number of state programs, in particular, with the implementation of the National Program for Regional Development to 2020, the Program for the Modernization and Development of Housing and Communal Services to 2020, the State Program "Ak Bulak" for 2011-2020, the State Program for Infrastructure Development "Nurly Zhol" for 2015 - 2019 (The program for Regional Development to 2020, 2014; The Program for the Modernization of Housing and Communal Services..., 2011; The Program "Ak Bulak" for 2011-2020..., 2011; The State Program for Infrastructural Development "Nurly Zhol"..., 2015). The programs are implemented at the expense of the state budget, their effectiveness reflects the current state policy in the country, and, eventually, contributes to meeting the demand of the population and business entities.

2. Materials and Methods

The following methods were used in conducting research on assessing the current state and development trends of housing and communal services: analysis, comparative approach, dialectical-logical approach, study and analysis of international experience, synthesis, deduction.

The works of such Russian scientific researchers as Goryushkin (2015), Silka *et al.* (2007), and Khametov are devoted to the issues of economic assessment of housing and communal services. Among Kazakhstani economists, the issues of assessment of housing and communal services were dealt with to varying degrees by Bayandin,

Zhakiyanov, and Shalbolova. However, the subject of the study has not been fully reflected in the issues of economic assessment of the ongoing reforms in housing and communal services at the regional level, which justifies the urgency of the research.

3. Results and Discussion

The research to assess the current state and determine the development trends of housing and communal services of the Republic of Kazakhstan in the period from 2011 to 2016, with the example of the Western region represented by Aktobe, Atyrau, West Kazakhstan and Mangystau regions was carried out. The economic assessment of housing and communal services development condition was based on an analysis of the implementation of state reform programs and the system development of quantitative and qualitative indicators for assessing, which, in our view, makes it possible to most clearly describe the current state and development trends of housing and communal services in the country. Therefore, we formed four groups of quantitative and qualitative indicators for assessing the current state of housing and communal services:

- 1) complex indicators (the housing supply ratio and the housing affordability ratio);
- 2) modernization of engineering infrastructure and housing and communal services (the length of heating, gas and sewerage systems and waterworks, the deterioration level of communal infrastructure);
- 3) effective and rational provision of the population with potable water and wastewater disposal services (accident rates on urban water supply and wastewater disposal networks, the share of effluents treated to standard quality in cities during discharges into water bodies);
- 4) development of housing construction and housing credit to the population (the area of built housing, housing investment and the volume of mortgage credit).

3.1 Composite indicators

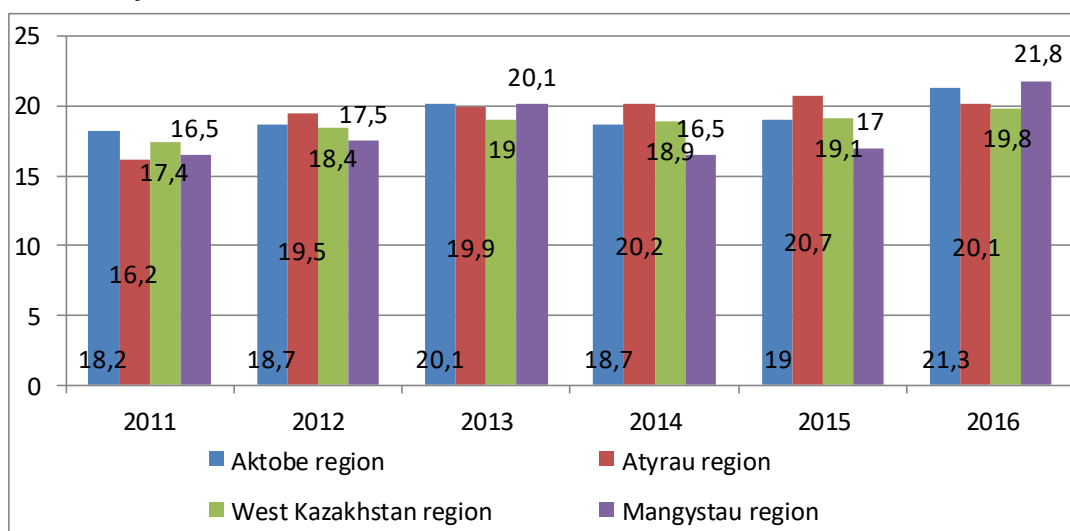
The housing stock condition is the main factor, which determines living standards of the population (Chernyak, 2007). The housing stock is dwellings of all forms of ownership on the territory of the Republic of Kazakhstan, which include public and private housing stock (Law of the Republic of Kazakhstan dated April 16, 1997..., 2017). Currently, 57% of the country population are urban residents living in public and private housing stock. In the studied region, the urban population forms 62% in the Aktobe region, 48% in the Atyrau region, 50% in the West Kazakhstan region and 48% in the Mangystau region (Official statistical information (by industries), 2017).

One of the most important indicators of housing stock assessment is the housing supply. The housing supply ratio is calculated by determining the total area of the housing stock per 1 person. The regional analysis of this indicator allows us to note

the general growth dynamics from 2011 to 2016 in all four regions: by 17% in the Aktobe region, 24% in the Atyrau region, 14% in the West Kazakhstan region and 32% in the Mangystau region (Figure 1).

However, in 2014 in the Aktobe, West Kazakhstan and Mangystau regions, the housing supply ratio declined by an average of 7%, 5% and 18%, respectively, due to the deterioration of the overall market conjuncture caused by the effects of the national currency's devaluation.

Figure 1. The housing supply ratio in the Western Region of the Republic of Kazakhstan for 2011-2016, %.



In general, positive dynamics is ensured by the fact that the pace of construction of new housing outstrips the growth of the population. In accordance with the construction norms and regulations of the Republic of Kazakhstan, the size of the living area per person must be at least 15 square meters (Construction norms and rules (SNiP) of the Republic of Kazakhstan..., 2007). At the same time, according to the recommended United Nations Organization standard for the provision of housing to citizens, a person must have 30 square meters (United Nations Organization standard for the provision of housing to citizens..., 2009). At present, only in Astana this indicator is the closest to the international one – 29 square meters. If the growth rate of the housing supply ratio in the medium term will be kept within 2011-2016 (5-10%), then Kazakhstan will be able to approach to the standards of the United Nations by 2019-2020.

To assess the housing affordability in international practice, the affordability ratio is widely used, based on the relationship between income and housing prices and

showing how long the average household can save for an average apartment. The formula for the affordability ratio is:

$$AR = (PR \times S m^2) / ((AMI - PM) \times N),$$

where, PR – value per square meter of housing, dollar;

S – apartment area, sq. m.;

AMI – average monetary income per capita, dollars per year;

SM – the level of the subsistence minimum, dollars per year;

N – number of household members, person (Goryushkin, 2015).

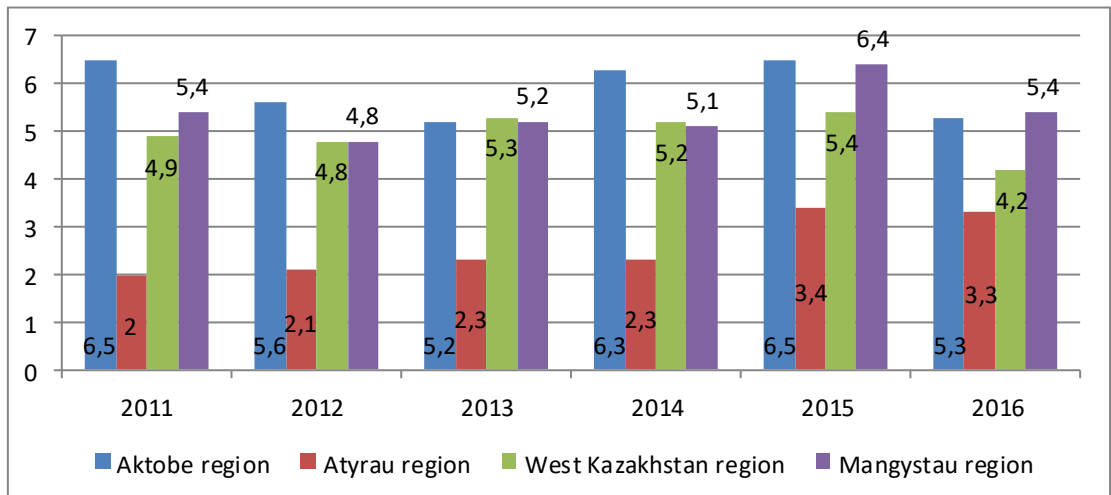
During the calculations, we corrected the data, which more closely takes into account the features of the study subject. Thus, for the variable PR the price of the sale of old housing, but well-furnished housing is accepted; S is accepted for a constant of 54 square meters, based on an average provision of 18 square meters per person, taking into account the size of a household of 3 people; AMI – average monetary income of the population, per capita; SM is level of the subsistence minimum, which is changed annually and approved under the National Budget Act; N is the number of household members, the value accepted not for a constant 3, but an actual for each region in accordance with the statistical data of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan (Law of the Republic of Kazakhstan dated November 29, 2010 No. 357-IV; Law of the Republic of Kazakhstan dated November 24, 2011 No. 496-IV; Law of the Republic of Kazakhstan dated November 23, 2012 No. 54-V; Law of the Republic of Kazakhstan dated December 3, 2013 No. 148-V; Law of the Republic of Kazakhstan dated November 28, 2014 No. 259-V; Law of the Republic of Kazakhstan dated November 30, 2015 No. 426-V; Official statistical information (by industries)). The calculations of the housing affordability ratio in the Western region of the Republic of Kazakhstan for 2011-2016 are presented below:

Calculations of the affordability ratio due to savings in the Western region of the Republic of Kazakhstan over the past 6 years have shown that today to purchase an apartment with an average area at an average cost in a city, a Kazakh family with an average income will need: 5.4 years in Mangystau, 5.3 years in Aktobe, 4.2 years in West Kazakhstan and 3.3 years in the Atyrau regions. At the same time, the family will have to live at the subsistence level.

The dynamics of the affordability ratio in the Western region over the last 6 years has improved in the Aktobe and West Kazakhstan regions by 1.2 and 0.7 years respectively, remained unchanged at 5.4 years in the Mangystau region, deteriorated in Atyrau for 1.3 years. The trend of increasing the housing affordability ratio in the Atyrau region is associated with a decrease in the purchasing power, income and disproportionate growth in house prices. The standard of the housing affordability ratio of economy class existing in most developed countries for 3.5 - 4.5 years in the study period from 2011 to 2016 is a stably characteristic for the Atyrau regional housing market and fluctuates within 2 - 3.4 years, which is due to the highest average monetary income per capita of the population both in the region under study

and in the country as a whole (United Nations Organization standard for the provision of housing to citizens, 2009).

Figure 2. *Housing affordability ratio in the Western region of the Republic of Kazakhstan for 2011-2016.*



3.2 Modernization of engineering infrastructure as well as housing and communal services

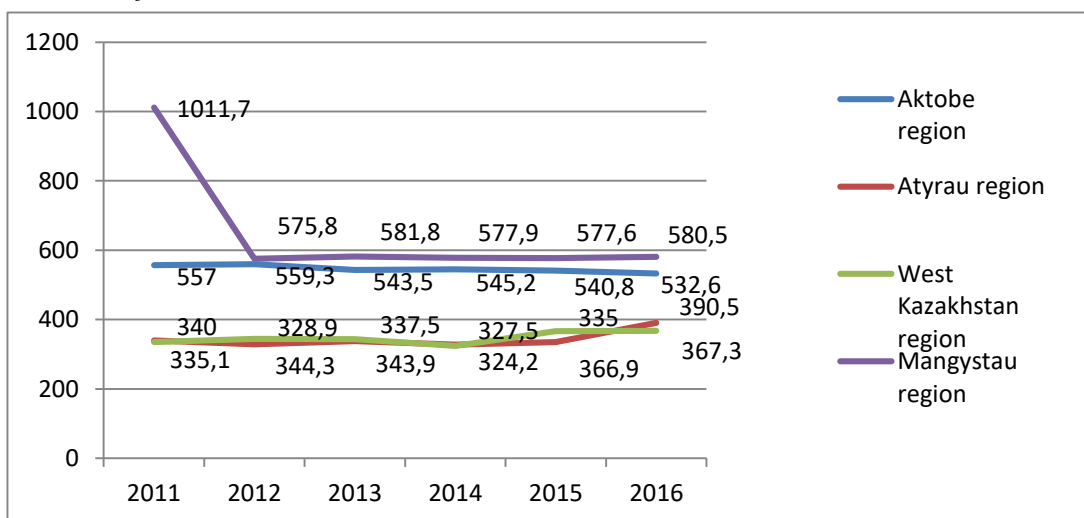
The length of the modernized / constructed systems is an effective indicator for achieving the goal of the state program for regional development until 2020 to create conditions for the development of the socio-economic potential of the regions through the formation of a rational territorial organization of the country, stimulating the concentration of the population and capital in the centers of economic growth (The program for Regional Development to 2020, 2014). Based on the dynamics of the overall length of heating, gas and sewerage systems and waterworks, the trends in the implementation of modernization of the engineering infrastructure and housing and communal services in the region under study shall be determined.

Heating system:

The dynamics of the length of heating system in the Western region in 2011-2016 shows a stable growth in the length of heating system by 15% in the West Kazakhstan region and by 10% in the Atyrau region (Figure 3).

In the Mangystau region, in 2012, the extent of heating system has been reduced by almost half, and in the following years, the indicator fluctuates towards growth by 2016. In 2012, in order to improve the heat supply system in Zhanaozen, work was carried out to modernize the existing heating system with a transfer from a 2-pipe system to a 4-pipe system using energy-saving pre-insulated pipes manufactured in Kazakhstan (Kazakhstan Pipe Plant LLP, Astana, and Aktau Polymer LLP, Aktau).

Figure 3. Length of heating system in the Western region of the Republic of Kazakhstan for 2011-2016, kilometers.



As a result, Zhanaozen achieved 100% availability of heat energy meters. According to the state-owned public enterprise OzenZhilu, as a result of the above-mentioned operations, losses on heating systems have decreased from 24% to 6%, 26.2% of cold water and 10.3% of natural gas have been saved. In 2014, in order to provide heat supply to new microdistricts and unloading of heating system of the upper zone of microdistricts 28, 28a, 29 and 30 of Aktau within the framework of the Program for Regional Development to 2020, a new backbone heat supply system from Thermal Station-1 to new microdistricts of Aktau was put into operation for 4,192 thousand dollars allocated from the republican budget.

In 2016 at the expense of borrowed budget funds under the "Nurly Zhol" program, works on the heating system of Aktau were made for the amount of 3,158 thousand dollars, with a length of 10.4 km. As a result, the number of accidents and outages on the heat supply system has decreased. In 2016, 2,151,564 thousand dollars were allocated from the National Fund for "Construction of autonomous boiler houses in the village of Mangystau Munaylinsky district", as a result of which it is planned to achieve energy savings, providing the population and social facilities with quality heat (Official website of Akimat of the Mangystau region, 2017).

In the Aktobe region, the length of heating system in 2011 decreased by 4% in 2016. In 2012-2015, 33.3 km of heating system were reconstructed and 3 central boiler houses were modernized in the Alga, Shalkar and Badamsha village of the Kargalinsky district, 10 projects for the modernization of heat supply systems in 10 settlements for a total amount of 81.8 million dollars were realized, reconstruction of 21 main and submain heating system of the "repair block and operation of boiler-

houses" in Aktobe and modernization of the heating system of Kandyagash were completed with a volume of public investments of 75.8 million dollars.

Within the framework of the Nurly Zhol Infrastructure Development Program, 112.1 million dollars was allocated from the National Fund for the implementation of 13 projects on reconstruction of heat supply facilities, including 12 projects for the reconstruction of boiler and heating system in Aktobe, 1 project for the reconstruction of the heating system in the Badamsha village of the Kargalinsky district – project in the Badamsha village. In 2016, within the framework of the Nurly Zhol Program, the central boiler house in Alga of the Alginsky District was modernized for a total of 865.8 thousand dollars (Official website of Akimat of the Aktobe region, 2017).

Gas systems:

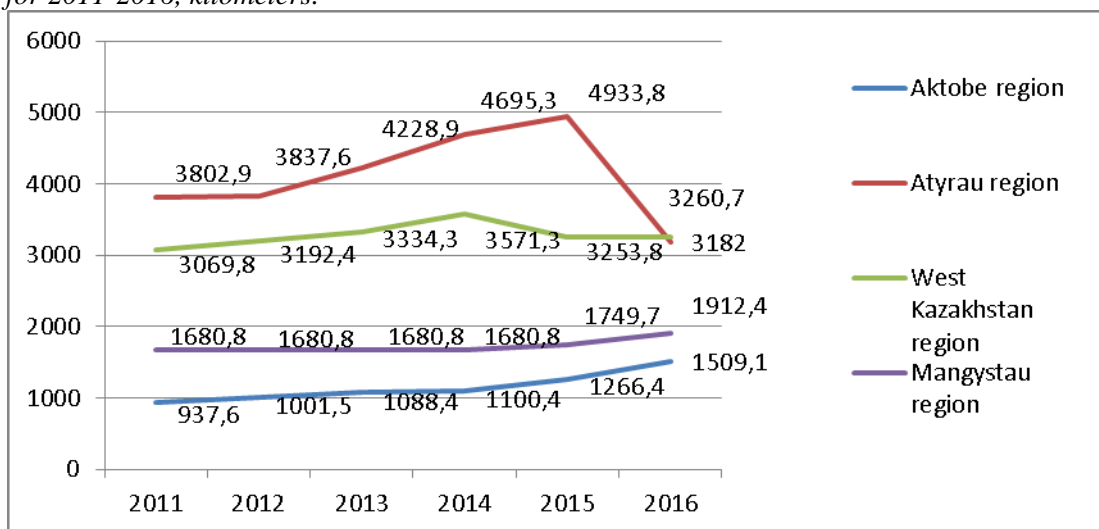
The dynamics of the length of gas systems in the region under study in 2011-2016 shows an increase in the length of gas systems in the Aktobe region by 61%, in the Mangystau region by 14% and in the Western Kazakhstan region by 4% (Figure 4). In the Atyrau region, from 2011 to 2015, there is an increase in the length of gas routes by 30%, and in 2016, in comparison with the previous year, a reduction of 40%. In 2016, out of 375 settlements of the Aktobe region, 110 settlements (29.3%), in which 86.7% of the region's population live, were gasified. This year, 12 projects worth 45.2 million dollars were also implemented, including the gasification of such villages: Komsomolskoye of Aytekebi district, Oiyl of Oiyl district, Kos-Istek of Kargaly district, Taldysai, Enbek, Altyndy of Mugalzhar district, Uchkuduk (Bogoslovka) of Alginsky district and Akkuduk of Khromtau district. In 2017, 15 projects were submitted to the Ministry of National Economy of the Republic of Kazakhstan for financing from the republican budget for a total of 13.6 million dollars (Official website of Akimat of the Aktobe region, 2017).

By 2016, as a whole, the Mangystau region has achieved 100% gas supply to settlements. According to the anticipated increase in demand for gas in the construction of vital facilities in Aktau in the north and other areas of perspective development, a decision was made to build a separate line of the main gas pipeline in the northern part of Aktau. The given construction will additionally allow solving the task of supplying additional volumes of natural gas for new microdistricts, including for objects of the new city center of Aktau, as well as reserving (connecting) the city's gas supply system to ensure uninterrupted gas supply (Official website of Akimat of the Mangistau region, 2017).

In the West Kazakhstan region, by 2016, the natural gas supply of the population was 93.4%, 275 rural settlements with a population of 593.1 thousand were gasified. In 2016, 5.8 million dollars were allocated for the gasification of the region from the republican budget, which enabled the provision of natural gas to more than 9,000 rural residents of 15 rural settlements and 58 social facilities in Syrym (10) and Shyngyrlau (5) districts. Also in the reporting year, 3.02 million dollars were

allocated to the Ural thermal station, which was strategically important for the regional center, and construction of the main and supplying gas pipeline to the Ural thermal station (republican budget - \$ 2.1 million, local budget - \$ 0.9 million) (Official website of Akimat of the West Kazakhstan region, 2017).

Figure 4. Length of gas systems in the Western region of the Republic of Kazakhstan for 2011-2016, kilometers.



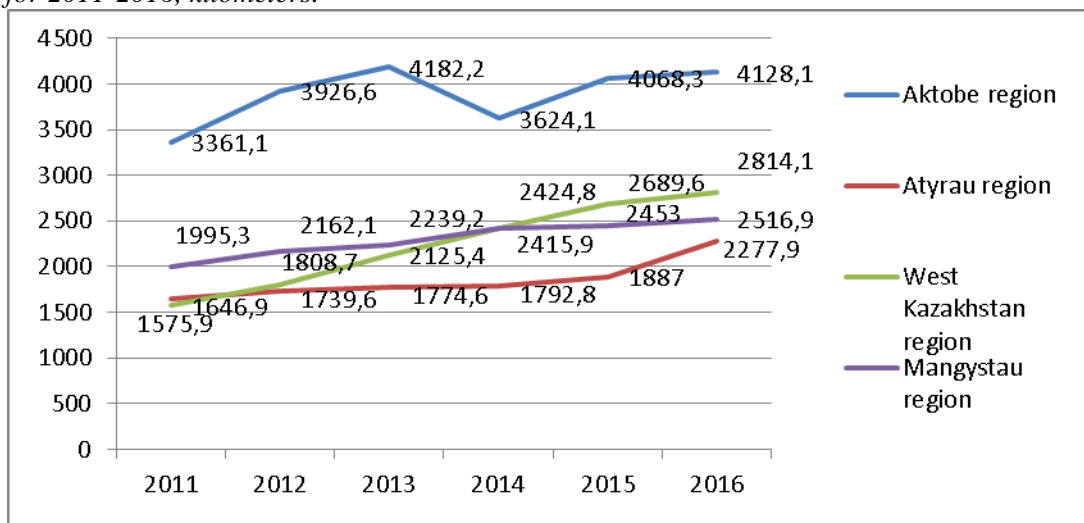
Waterworks:

Dynamics of extension of waterworks in the Western region of the Republic of Kazakhstan for 2011-2016 shows an increase in the length of waterworks in all four regions: 79% in the West Kazakhstan region, 38% in Atyrau region, 26% in Mangystau region and 23% in Aktobe region (Figure 5).

In the West Kazakhstan region in 2016, 2.17 million dollars were allocated from the republican budget to subsidize the cost of potable water services from especially important group and local waterworks that are no alternative sources of potable water supply, as well as additional \$ 0.6 million with local budget. Within the limits of these funds, the cost of drinking water supply services to the population of 78 settlements of the region in the amount of 2,423 thousand square meters was subsidized, the population coverage amounted to 128.6 thousand people (Official website of Akimat of the West Kazakhstan region, 2017).

In the Mangystau region in 2016, the urban population has access to centralized water supply of 99.6%, in particular in the city of Aktau – 100% (MAEK-Kazatomprom LLC, Kyulyus microdistrict), Zhanaozen – 100% (Astrakhan-Mangyshlak, the microdistrict of Tuies, Sauyskan), Fort-Shevchenko – 80% (Ketik microdistrict) (Official website of Akimat of the Mangistau region, 2017).

Figure 5. Length of waterworks in the Western region of the Republic of Kazakhstan for 2011-2016, kilometers.



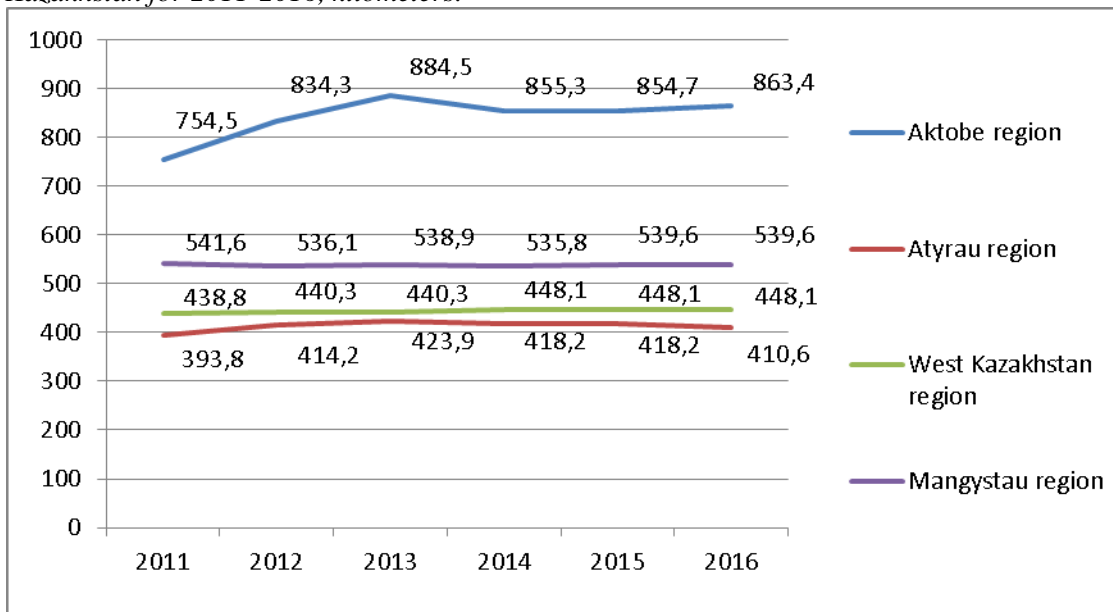
In the Aktobe region in 2016, the provision of population with centralized water supply is 90.5%, the provision settlements – 45.3%. Within the framework of the State Programs "Ak Bulak", "Regional Development to 2020", 100 projects on water supply and wastewater disposal were implemented with coverage of 68 settlements with a total population of more than 54,780 people for the amount of 68.2 million dollars allocated from the republican and region budgets (Official website of Akimat of the Aktobe region, 2017).

Sewerage systems:

Dynamics of the extent of sewage systems in the Western region of the Republic of Kazakhstan for 2011-2016 shows an increase in the length of sewage systems by 14% in the Aktobe region, 4% in the Atyrau region, 2% in the West Kazakhstan region and a slight decrease of 0.4% in the Mangystau region (Figure 6). In the Aktobe region in 2016, as part of the Infrastructure Development Program of Nurly Zhol, the sewerage system in the village of Kargaly was reconstructed for 957.2 dollars and the sewerage systems of Alga were expanded for 933.3 dollars (Official website of Akimat of the Mangistau region, 2017). In the West Kazakhstan region in 2016, during the implementation of the Infrastructure Development Program of Nurly Zhol, 15 kilometers of sewerage systems of Uralsk and Aksai cities were reconstructed, as a result of which the deterioration of sewage systems was reduced from 66.6% to 63.5% (Official website of Akimat of the West Kazakhstan region, 2017). In the cities of the Aktau and Zhanaozen, Mangystau region, centralized wastewater disposal is used. Access of the population to centralized wastewater disposal by cities is 87.3%. In rural settlements, individual housing construction (one-, two-staged private houses / cottages) with septic tanks is predominantly built. In 2010, 3.7 kilometers of sewerage systems were replaced in the region, in 2011 -

7.1 kilometers, in 2012 - 2.4 kilometers, in 2013 - 30.445 kilometers, in 2014 it is planned to replace 4.2 kilometers, in 2015 year - 4.5 kilometers (*Official website of Akimat of the Mangistau region, 2017*).

Figure 6. Length of sewerage systems in the Western region of the Republic of Kazakhstan for 2011-2016, kilometers.

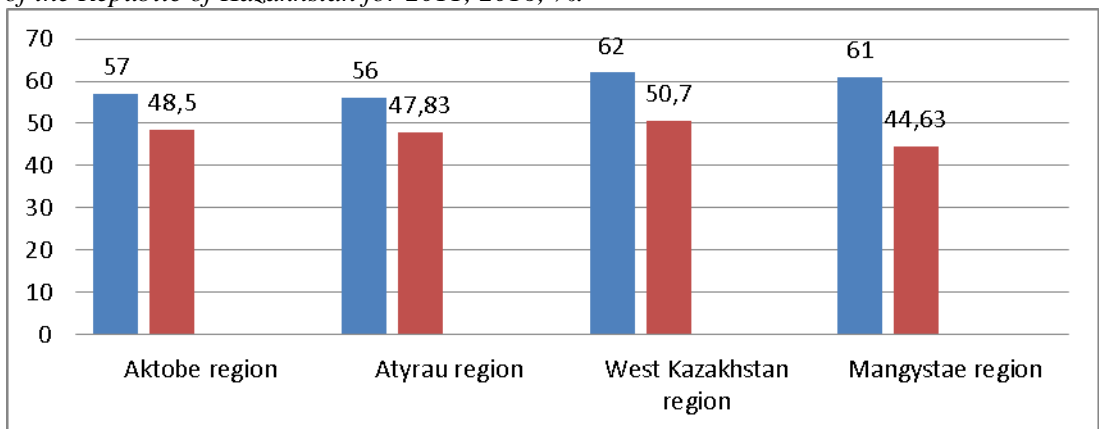


Deterioration of communal infrastructure:

The deterioration level of the communal infrastructure assumes the degree of physical deterioration on the utility networks of housing and communal services, water, sewage and heating systems. In the Republic of Kazakhstan, the indicator of the deterioration level of the communal infrastructure is calculated according to the methodology for calculating the deterioration of utility networks (hereinafter the Methodology), which by technical inspection regulates the required amount of work and the procedure for their performance, criteria for assessing serviceability in determining the deterioration of utility networks. The methodology determines the necessary list of works, studies, tests and calculations that allow calculating the deterioration of heating system, waterworks and wastewater disposal, and is based on individual diagnosis of the examined system (Method of calculating the depreciation of utility networks, 2017). Figure 7 shows the dynamics of the deterioration level of communal infrastructure for 2011 and 2016 in the context of the West region of the Republic of Kazakhstan under study, according to which there was an overall reduction in the deterioration of utility networks in all areas.

Thus, the decrease in the deterioration level of the communal infrastructure in the Aktobe region occurred by 8.5%, in the Atyrau region by 8.17%, in the West Kazakhstan region by 11.3% and in the Mangystau region by 16.37%.

Figure 7. The deterioration level of communal infrastructure in the Western region of the Republic of Kazakhstan for 2011, 2016, %.



Today, the technical condition of fixed assets of housing and communal services requires further investments in the modernization and reconstruction of utility networks, along with annual losses, the level of technical deterioration of fixed assets also increases. However, it should be noted that over the past 6 years, as a result of the implementation of state industry programs, it has been possible to achieve a 10% reduction in the deterioration level of the communal infrastructure in the Western region. Thus, as early as 2016, the region achieved the nationwide direct result of 2019 in 53% (The State Program for Infrastructural Development "Nurly Zhol" ..., 2015).

3.3 Effective and rational provision

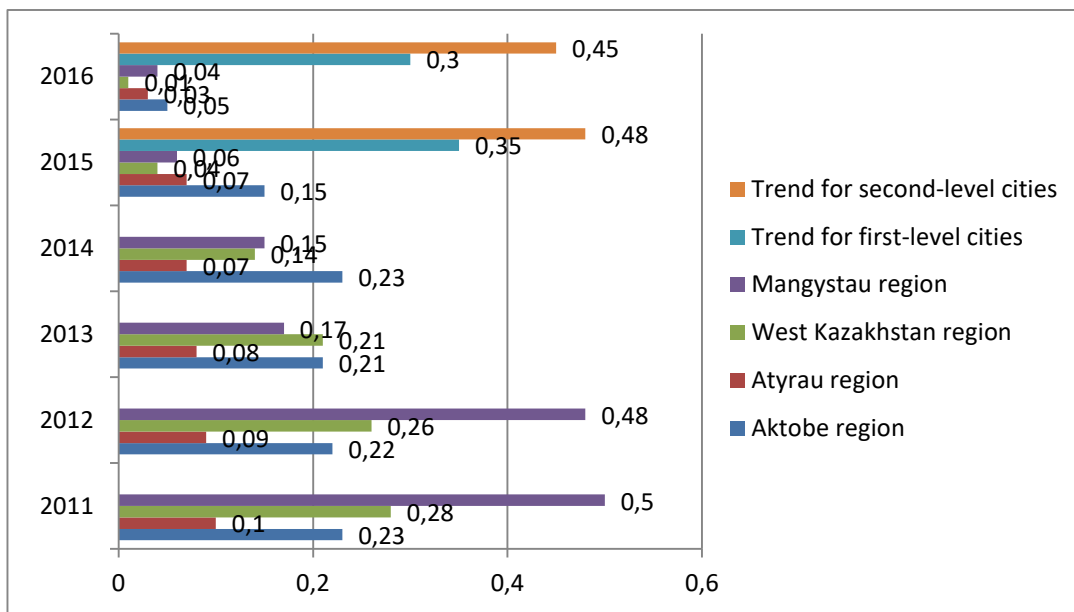
Effective and rational provision of the population with potable water and wastewater disposal services is the fourth task of the Program for Regional Development to 2020, according to which its achievement will be measured by the following performance indicators:

- reduction of accidents on urban water supply and wastewater disposal networks, number of accidents per 1 kilometer of networks (rate);
- the share of effluents treated to standard quality in cities during discharges into water bodies.

Table 2 reflects the standards of indicators of the results of effective and rational provision of the population with potable water and services, for which there should be no higher rate of accidents on urban water supply and wastewater disposal networks, and there should be no less than the share of effluents treated to standard quality in cities during discharges into water bodies. As a result of the calculations, on the basis of data of the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan, the accident rate was calculated for urban water

supply and wastewater disposal networks in the region studied for 2011-2016. (Figures 8 and 9).

Figure 8. Accident rate on urban water supply networks in the Western region of the Republic of Kazakhstan for 2011- 2016.



The index of the accident rate on urban water supply networks in the region under study has gradually decreased in the period from 2011 to 2016, in the Aktoke region by 36%, in the Atyrau region by 70%, in the West Kazakhstan region by 96% and in the Mangystau region by 92%. Thus, the standards of the accident rate on urban water supply networks were exceeded:

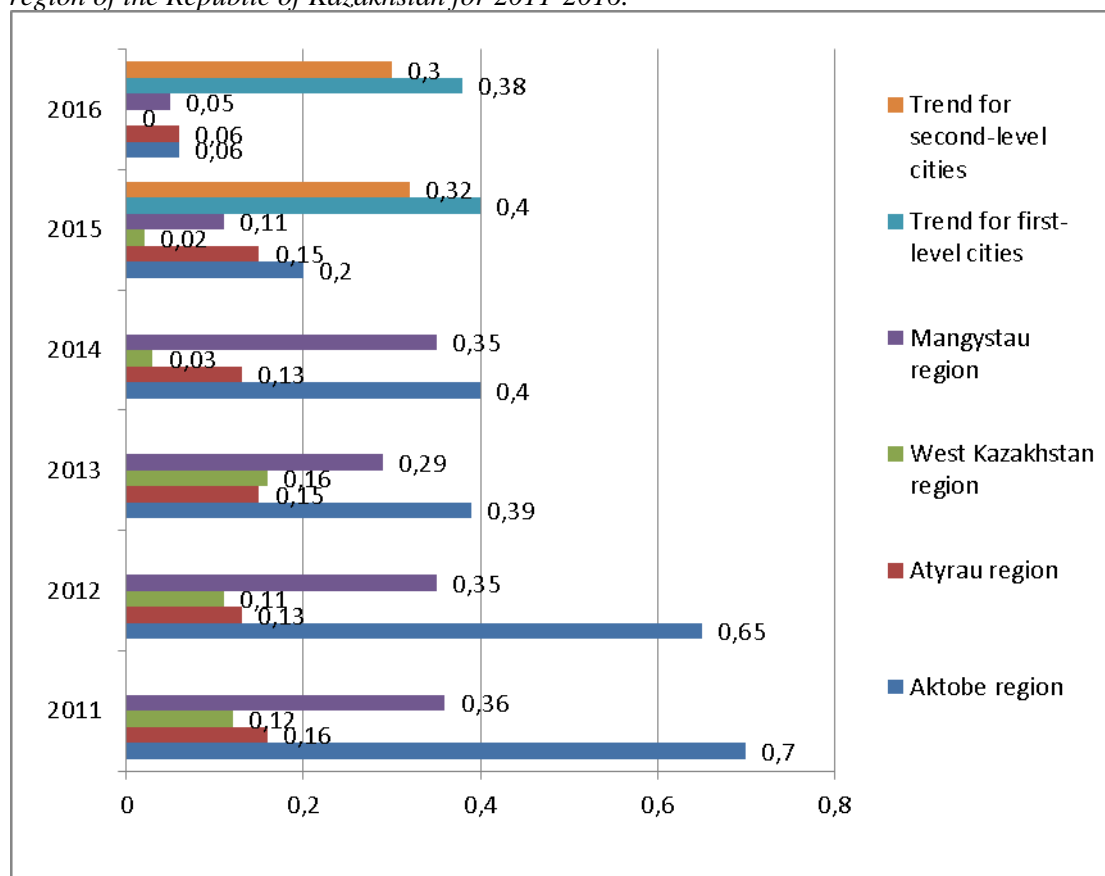
- Aktoke region in 2015, by 2.3 times and in 2016, by 6 times;
- Atyrau region in 2015, by 6.9 times and in 2016, by 15 times;
- West Kazakhstan region in 2015, by 12 times and in 2016, by 45 times;
- Mangystau region in 2015, by 8 times and in 2016, by 11.3 times.

In the West Kazakhstan region in 2016, under the Infrastructure Development Program "Nurly Zhol" for 2015-2019, the National Fund allocated 7.5 million dollars for the implementation of 9 projects to reconstruct 185.7 kilometers of water supply networks in the districts of the region (Akzhaik, Burlinsky, Zelenovsky and Syrymsky) (Official website of Akimat of the West Kazakhstan region, 2017). The indicator of the accident rate on urban wastewater disposal networks in the region under study has gradually decreased in the period from 2011 to 2016, 91% in the Aktoke region, 63% in the Atyrau region, 100% in the West Kazakhstan region and

86% in the Mangystau region. Thus, the standards of the accident rate on urban water supply networks were exceeded:

- Aktoobe region in 2015, by 2 times and in 2016, by 6.3 times;
- Atyrau region in 2015, by 2.1 times and in 2016, by 5 times;
- West-Kazakhstan region in 2015, 18 times and in 2016, by 5 times;
- Mangystau region in 2015, by 2.9 times and in 2016, by 6 times.

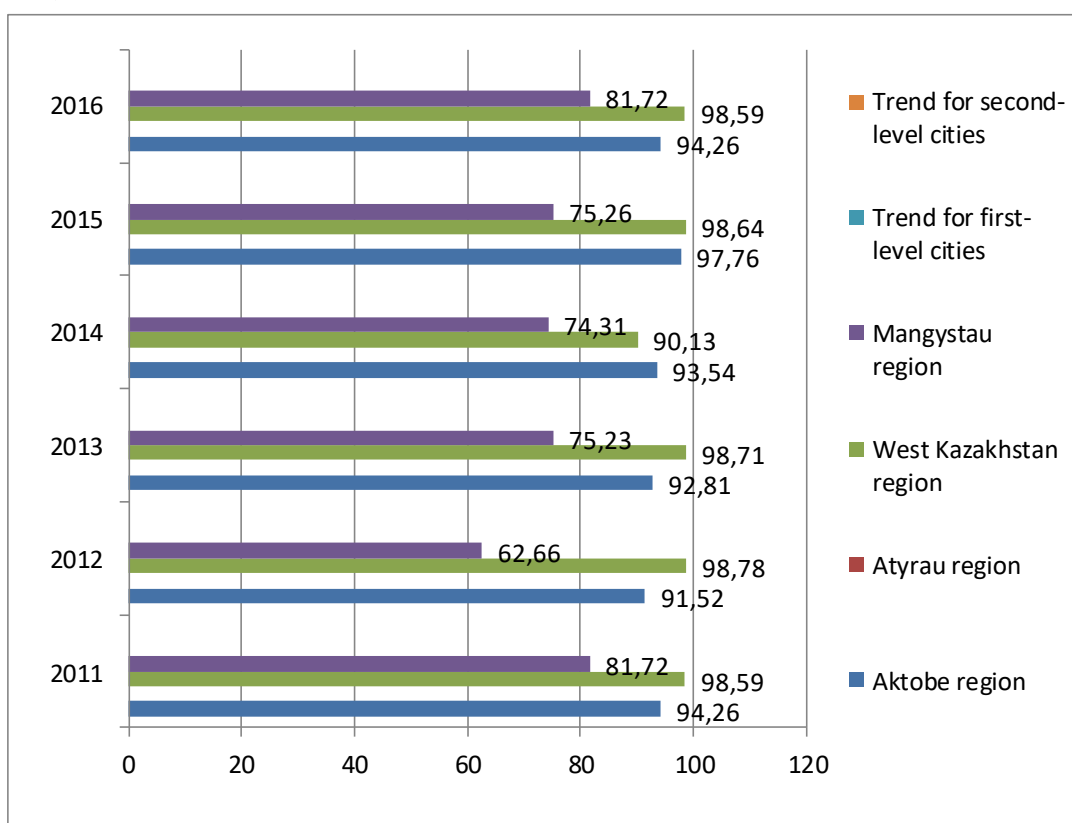
Figure 9. Accident rate on urban wastewater disposal networks in the Western region of the Republic of Kazakhstan for 2011-2016.



In the Aktoobe region in 2016, under the Infrastructure Development Program "Nurly Zhol" 12 projects on construction and reconstruction of water supply and wastewater disposal systems of Aktoobe city and 9 settlements of Alginsky, Aytekebi, Shalkar, Mugalzhar and Temir districts are implemented for a total of 12.4 million dollars including the project of construction of group water supply networks to provide population of Nura and Mamyr villages of Irgiz district with centralized water supply for the amount of 1.9 million dollars (Official website of Akimat of the Aktoobe region, 2017).

In the Mangystau region, only the cities of Aktau and Zhanaozen are equipped with wastewater disposal and effluent treatment systems. There are 31 sewerage facilities in the region. The length of sewerage networks, which are in communal ownership is 403.8 kilometers, 302.26 kilometers of it need to be replaced. Sewage networks are operated for more than 30 years and have a deterioration level of 80%, sewage pumping stations - 80%, effluent treatment facilities - 90%. At present, the majority of enterprises that provide water and sewerage services are characterized by a low degree of financial stability and are unprofitable. In this situation, the problem lies in the ratio of enterprises tariffs for water management and (or) sewerage systems and incomes of the population (not taking into account the level of management at these enterprises) (Official website of Akimat of the Mangistau region, 2017). The indicator of the share of effluents treated to standard quality in cities during discharges into water bodies in the investigated region remained at the 2011 level in 2016 in the Aktoe region, in the West Kazakhstan region and in the Mangystau region (Figure 10).

Figure 10. Share of effluents treated to standard quality in cities during discharges into water bodies in the Western region of the Republic of Kazakhstan for 2011-2016, %.



This indicator has improved relative to:

- The standard of 2015 in the Aktobe Region by 27.8%, in the West Kazakhstan region by 72.9% and in the Mangystau region by 32%;
- The standard of 2016 in the Aktobe region by 19.3%, in the West Kazakhstan region by 45% and in the Mangystau region by 20.2%.

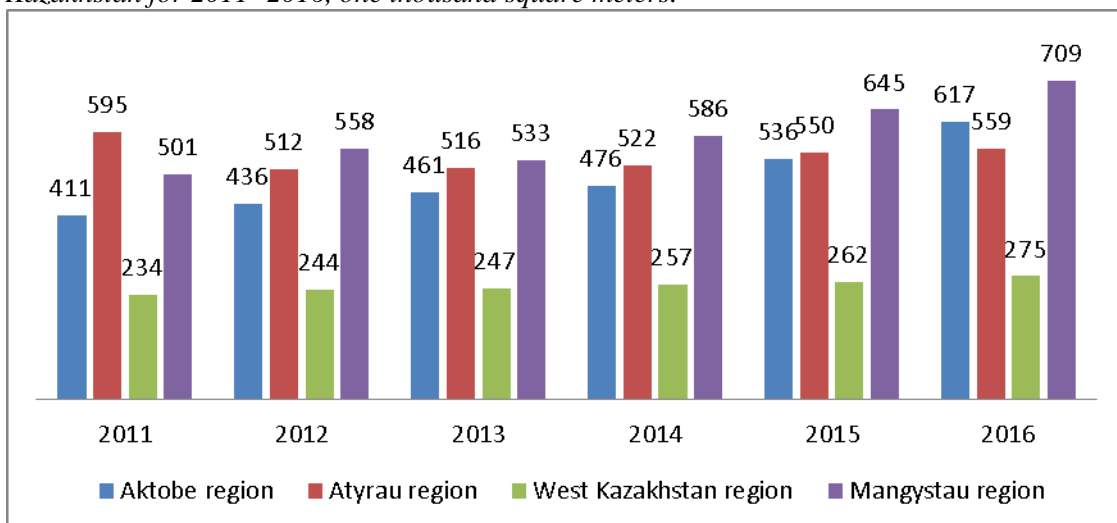
According to the Atyrau region, the share of effluents treated to standard quality in cities during discharges into water bodies in 2011-2016 is in a critical situation. Therefore, in 2015 the indicator is less than the standard by 18.8 times and in 2016 by 23.5 times. In the region, 98.5% of settlements use surface water sources and 1.5% use underground water sources. 1853 kilometers require major repairs, deterioration level is 70%. 249,838 kilometers are in emergency condition, the actual costs of water supply networks are 30%. 61% of settlements are provided by centralized water supply, 8.5% by imported water. Currently, due to the long-term use of technical facilities and failure to perform annual repairs, most water supply tasks are unsatisfactory. For the development of water supply systems, within the Ak Bulak program, 11.5 million dollars were allocated from the national budget and 9.7 million dollars from the local budget, which were used to build 9 new water effluent plants and reconstruct 23 new water effluent plants. At the same time, the construction and the reconstruction of water pipelines groups in 57 rural settlements of the area were completed (Official website of Akimat of the Atyrau region, 2017).

Thus, from the indicators of the results of effective and rational provision with potable water and wastewater disposal services in the West region in 2011-2016 the accident rates on urban water supply networks and accident rates on urban wastewater disposal networks in all areas are met in accordance with the standards. The indicator of the share of effluents treated to standard quality in cities during discharges into water bodies is fulfilled in accordance with the standards in the Aktobe, West Kazakhstan and Mangystau regions and is at a critical level in the Atyrau region.

3.4 Development of housing construction and housing credit

Development of housing construction and housing credit to the population is one of the five tasks of the Program for Regional Development to 2020, the result of which is the introduction of housing in the country. For a more accurate description of the development of housing and communal services, we have introduced additional indicators of the volume and investment of housing construction and the volume of mortgage credit, thus forming the fourth group of quantitative and qualitative indicators for assessing the state of housing and communal services. The area of built housing in the Western region of the Republic of Kazakhstan for 2011-2016 grew: by 50.1% in the Aktobe region, by 17.5% in the West Kazakhstan region, by 41.5% in the Mangystau region and by 6% in the Atyrau region (Figure 11).

Figure 11. The area of built housing in the Western region of the Republic of Kazakhstan for 2011- 2016, one thousand square meters.



At the same time, the analysis of the implementation of the indicator of the result of the area of housing commissioned under the Program for Regional Development to 2020 in the region under investigation over the past 2015 and 2016 showed that:

- Aktope region is overfulfilled in 2015 by 17.7% and in 2016 by 28.8%;
- Atyrau Region is overfulfilled in 2015 by 12.1% and in 2016 by 6.5%;
- West Kazakhstan region is overfulfilled in 2015 by 9.2% and not fulfilled in 2016 by 4.9%;
- Mangystau Region is overfulfilled in 2015 by 29.0% and in 2016 by 41.6%.

The calculation of the area of housing penetration per capita over 6 years in the study region showed an increase in the Aktope (40%) and Mangystau regions (10%), stability in the West Kazakhstan region and a decrease in the Atyrau region (-18%). As the data in Table 4 show, the growth rate of the area of built housing does not exceed the growth rate of the area of built housing per capita in the region studied. Thus, the construction industry is developing regardless of the demographic growth of the region. The volume of investments in housing construction in the Western region of the Republic of Kazakhstan for 2011-2016 grew by 2.1 times in the Aktope region, by 1.9 times in the West Kazakhstan region, by 1.5 times in the Mangystau region and by 1.2 times in the Atyrau region (Figure 12).

For the 6 years of studying, the growth in the volume of mortgage credits in the Western Region of the Republic of Kazakhstan was 41% in the Aktope region, 40% in the Atyrau region, 35% in the West Kazakhstan region and 28% in the Mangystau region (Figure 13).

Figure 12. The volume of investment in housing construction in the Western region of the Republic of Kazakhstan for 2011- 2016, billion dollars.

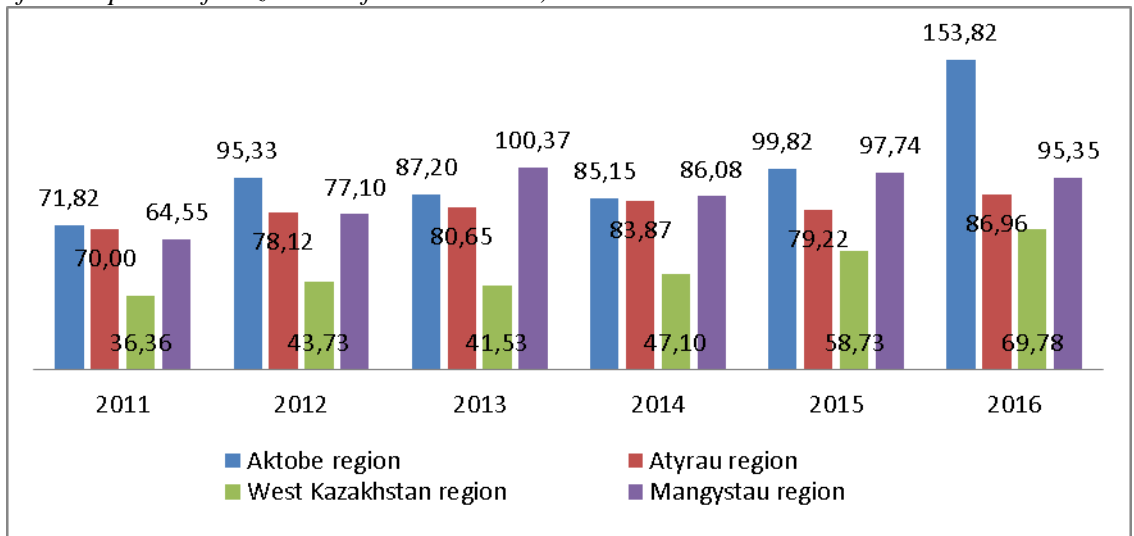
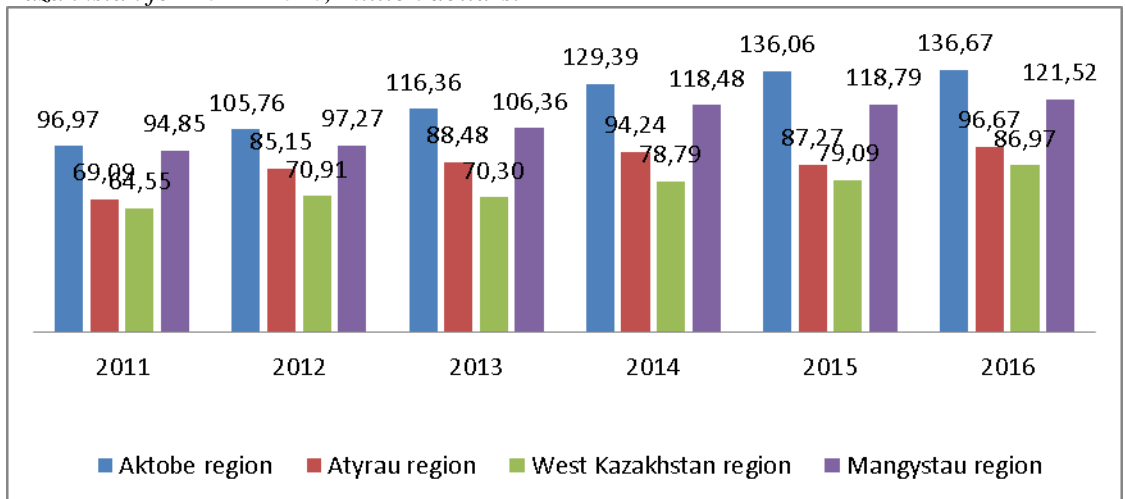


Figure 13. The volume of mortgage credits in the Western region of the Republic of Kazakhstan for 2011- 2016, million dollars.



In connection with the suspension of mortgage credits in banks over the past year, the loan mortgage portfolio has grown only by 0.4% in the Aktobe region, by 11% in the Atyrau region, by 10% in the West Kazakhstan region and by 2% in the Mangystau region. This was influenced by two factors: firstly, banks limited the loans lending for real estate in the period of deterioration of the economic situation in the country; secondly, potential borrowers do not rush to take expensive loans themselves. As an alternative, in such a situation for a resident of the region wishing to improve his housing conditions, the state, within the framework of the State

Program for Infrastructure Development "Nurly Zhol" for 2015-2019, implements housing projects in the following areas:

- 1) Rental housing of the JSC Baiterek Development;
- 2) Rental housing of the JSC Mortgage Organization Kazakhstan Mortgage Company;
- 3) Credit housing of the JSC Baiterek Development;
- 4) Credit housing through local executive bodies;
- 5) Commercial housing through the JSC Samruk-Kazyna Real Estate Fund (The program for Regional Development to 2020..., 2014).

The experience of foreign countries shows that for cardinal improvement of housing provision in acceptable terms (during the life cycle of one generation), construction activity should be about 1 square meter per person per year. For example, in the period of the intensive solution of the housing problem in Japan, 0.9-1 square meters of housing per person were built each year, in the USA - 0.7-0.8 square meters, in France and Germany - about 0.7 square meters. According to the international standards, normal housing provision has now been formed only in the Mangystau region and is in danger in the West Kazakhstan region.

4. Discussion

We should not forget that all analyzed systems cannot be deployed in the educational organization of higher education immediately, because effective implementation of the management system is also very difficult. It seems that the most customized products are being implemented in the field of distance education. With the introduction of information products in the deeper stages of educational organization of higher education, usually, it is facing many serious difficulties.

The first and the main difficulty, of course, is the financial one. Not only software itself cost money, the cost of the necessary equipment and the other related software often outweigh the costs many times over. It is necessary to pay attention to the fact, that geographically the majority of educational institutions of higher education are located at various locations within a single region of the Russian Federation, and sometimes in different regions.

In addition, although this is not a problem in conditions of the quality Internet, coverage, however, it involves many expenses, such as the purchase and support of software and equipment, and connection the channels of communication, payroll of specialists to support the operation of all systems. Large educational institutions of higher education often deploy own telecommunication networks and even create a dedicated server rooms in their buildings. Creation of the distributed system requires purchase of the large number of equipment, as well as different software for their effective work. Such expenditure can be estimated in the hundreds of thousands of dollars, that can have very big for the budget of the educational institutions of higher

education and/or science, of even be too much for budgets of many educational and/or research institutions.

It is well known that "the right to education is guaranteed to everyone" (Semenova and Kiseleva, 2015), appropriate ICS may not only limit costs and systemize documentation of the educational and/or scientific institution, but also provide chances for opening new campuses instead of separate branches of educational institutions (which was previously very common for Russian Federation).

5. Conclusion

As shown by calculations of complex indicators - the level of housing supply and housing affordability, the situation in the regional housing markets in the Western Region is completely heterogeneous. This is due to various starting indicators of housing supply in the regions, and uneven growth in housing stock, and an increase in the population, as well as the diverse investment attractiveness of the regions.

The implementation of state industry programs for the modernization of engineering infrastructure and housing and communal services in the Western region has a generally positive development dynamics. At the same time, in view of the high level of physical deterioration of housing and communal services fixed assets, further investments are required for the modernization and reconstruction of utility networks.

From the indicators of effective and rational provision of the population with potable water and wastewater disposal services, the norms of the accident rates on urban water supply and wastewater disposal networks have been exceeded in all regions of the Western region. Whereas, the indicator of the share of effluents treated to standard quality in cities during discharges into water bodies has a positive growth trend only in Aktobe and Mangystau regions and does not correspond at all and is at a critical level in the Atyrau region.

The development of housing construction and housing credit of the population in the Western region is characterized by a relatively positive dynamics in the growth of the housing construction industry, regardless of the demographic growth of the region. At the same time, an increase in the volume of investments in housing construction takes place against the backdrop of a worsening economic situation in the country, which has affected the reduction of mortgage credits to banks.

The results of calculating the quantitative and qualitative indicators of the assessment of the state of housing and communal services in the Western Region for individual regions correspond to the international standards of developed countries. Among them, the housing affordability ratio of the economy class in the Atyrau region and housing provision, characterized by the area of housing per capita introduced, in the Mangystau region.

Thus, summarizing the above, we can conclude that the reform in housing and communal services in the Western region has been gradually carried out, adapting foreign experience to Kazakhstan's reality to the extent possible. To achieve effective results in the economic development of housing and communal services in the cities of the Western region, a comprehensive system for assessing its development in accordance with state industry programs is needed.

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